

CLAIMS

1. A folding machine including: a pair of folding rollers (1, 3) rotating about axes essentially parallel to each other and defining a nip (5) through which a web material (N) to be folded passes, disposed on each of which are 5 folding members (61, 61A; 63, 63A) which form folds on said web material parallel to the axis of rotation of the folding rollers; and, for each of said folding rollers (1, 3), a transferring device (11, 13) to transfer packs of products folded by the folding rollers towards an unloading area (9), which transfer device includes a plurality of separating fingers (15) movable along a closed 10 path, from an area of engagement with the folded products to an unloading area of the folded products; characterized in that each of said transferring devices extends inside an annular groove (1G, 3G) of the respective folding roller (1, 3).
2. Folding machine as claimed in claim 1, characterized in that said 15 closed path is defined by a track (19) sliding inside and projecting from which are said separating fingers (15), said track (19) extending inside said annular groove (1G, 3G).
3. Folding machine as claimed in claim 1 or 2, characterized in that on each of said folding rollers at least one folding gripper (61; 63) is provided, 20 oscillating about an axis (C) parallel to the axis of rotation of the respective folding roller (1; 3), interrupted at the level of said annular groove (1G; 3G).
4. Folding machine as claimed in claim 1 or 2 or 3, characterized in that on each of said folding rollers at least two folding grippers (61, 63) are provided.
5. Folding machine as claimed in claim 3 or 4, characterized in that each of said folding grippers (61, 63) is equipped with an oscillating control shaft (65), which has an elbow configuration (65G) at the level of the annular groove (1G, 3G), the transferring device (11; 13) interfering with the axis of oscillation (C) of said control shaft (65).
6. Folding machine as claimed in one or more of the previous claims, characterized in that each transferring device includes a sliding track (19) defining said closed path for said separating fingers (15), which extend approximately orthogonal to said track and have respective guide bases (17)

engaging slidingly in said track (19); the track having an essentially rectilinear forward section (19A), extending from the folding rollers (1, 3) to said unloading area (9) of the packs of products, and a return section; said forward and return sections being connected by a first curvilinear end portion (19C), adjacent to the folding rollers (1, 3) and a second curvilinear end portion (19D), adjacent to the unloading area (9), the first curvilinear end portion (19C) intersecting the cylindrical surface of the respective folding roller (1; 3).

7. Folding machine as claimed in one or more of the previous claims, characterized in that each of said transferring devices comprises a continuous flexible member (21) to convey the separating fingers along said closed path.

8. Folding machine as claimed in claims 6 and 7, characterized in that said flexible member (21) cooperates with the guide bases (17) of the respective fingers (15).

9. Folding machine as claimed in claim 6 or 7, characterized in that said flexible member (21) is inside the closed path followed by the guide bases (17) of said fingers, remaining constrained in the vertical space of said guide bases (17).

10. Folding machine as claimed in claim 9, characterized in that said flexible member acts on a surface of said guide bases (17) facing the inside of the closed path defined by said track (19).

11. Folding machine as claimed in one or more of claims 6 to 10, characterized in that a rotating inserting member (41) is associated with the first curvilinear end portion (19C) of said track (19), to pick up the separating fingers (15) from the return section (19B) of said track and insert them in the forward section (19A) of said track, making said fingers travel along the corresponding curvilinear end portion (19C) of said track.

12. Folding machine as claimed in claim 11, characterized in that said rotating inserting member (41) penetrates said annular groove (1G; 3G) in the corresponding folding roller (1; 3).

13. Folding machine as claimed in claims 7 and 11, characterized in that along a terminal part of the return section of the track (19) and along part of the first curvilinear end portion (19C) of said track (19) the separating fin-

gers (15) are not in contact with said flexible conveying member (21).

14. Folding machine as claimed in claim 13, characterized in that said flexible member (21) is driven around a first guiding wheel (23) associated with said rotating inserting member (41), the axis of rotation (B) of the 5 first guiding wheel and the axis of rotation (A) of the rotating inserting member (41) being parallel and eccentric.

15. Folding machine as claimed in claim 14, characterized in that the eccentricity of said axes of rotation of the first guiding wheel (23) of the flexible member (21) and of the rotating inserting member (41), the diameter 10 of said first guiding wheel and the diameter of the first curvilinear end portion (19C) of the track (19) of the separating fingers, are arranged and dimensioned so that the bases of the inserting fingers are not in contact with the flexible member for an angle ranging from approximately 90° to approximately 160° of the first curvilinear end portion (19C) of the track (19), the fingers (15) 15 being brought into contact with the flexible member (21) by the rotating inserting member (41) at the end of said first curvilinear end portion of the track.

16. Folding machine as claimed in claim 14 or 15, characterized in that said first guiding wheel is at least partially inside said annular groove (1G; 3G) in the respective folding roller.

20 17. Folding machine as claimed in claim 16, characterized in that said rotating inserting member (41) is controlled by means of a driving wheel (43) meshing with it, positioned on the outside of said annular groove (1G; 3G).

25 18. Folding machine as claimed in one or more of claims 7 to 17, characterized in that said continuous flexible member (21) is a belt comprising a base layer (21A) and a shaped coating (21B), cooperating with corresponding slots (17A) in the bases (17) of the separator fingers (15).

30 19. Folding machine as claimed in one or more of claims 6 to 18, characterized in that a rotating sprocket (53) is disposed at the level of said second curvilinear end portion (19D) of the track (19) of the separating fingers (15), to pick up the fingers from the forward rectilinear section (19A) and transfer them to the return section (19B) of said track (19).

20. Folding machine as claimed in claims 7 and 19, characterized in

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that at the level of said second curvilinear end portion (19D) the continuous flexible member is not in contact with the bases of the separating fingers.